Log Cabin Envelope Makeover

BY MATT BURSTEIN

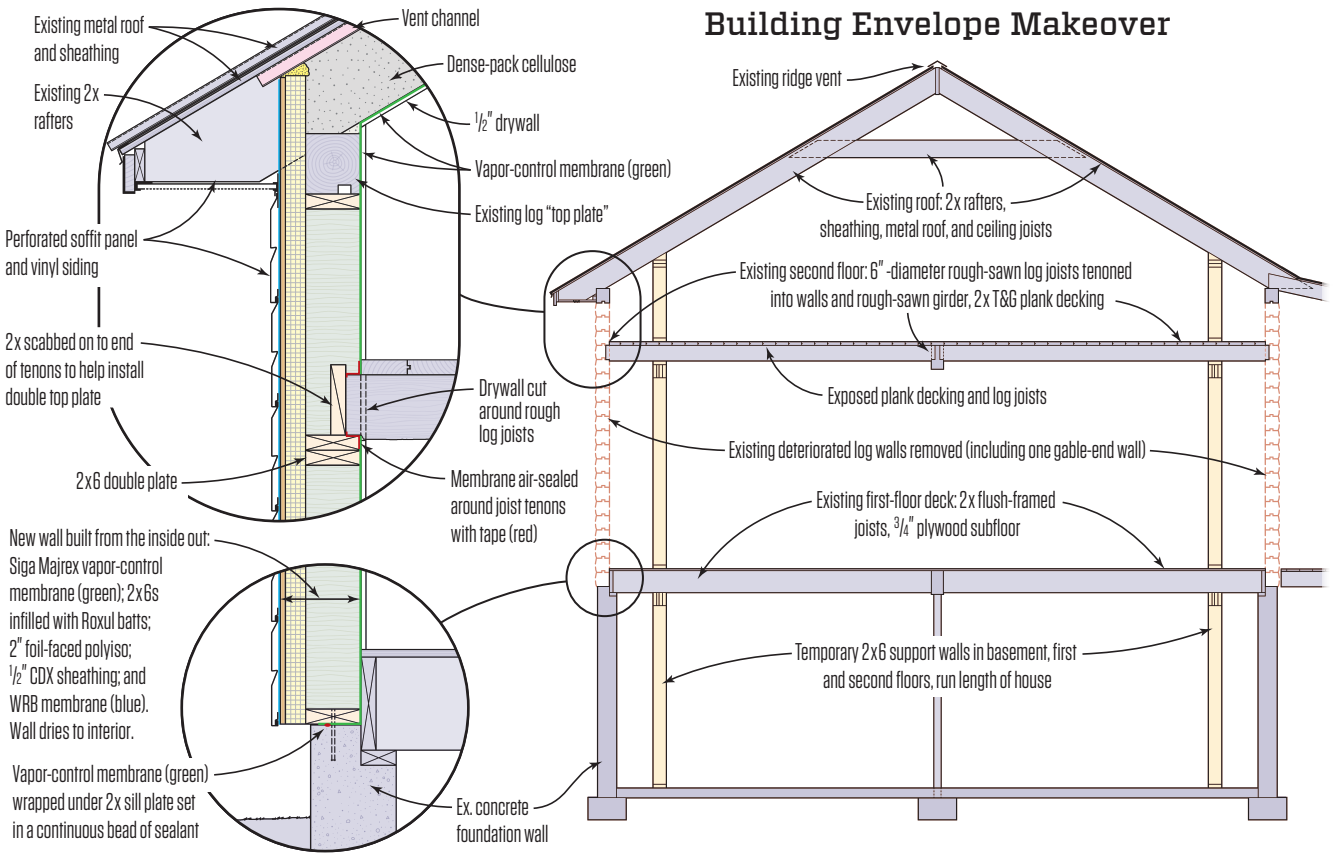
In spring 2019, a potential client contacted me about an energy upgrade project on behalf of his father, who lived in a log cabin in Vermont, right on the U.S.-Canada border (if you crossed the road, you would be in Quebec Province). During our brief conversation, he mentioned a couple of times—almost in passing—that "some of the walls needed to be replaced," and that he had reached out to a number of other builders but none was interested. I told him I was willing to visit the home and arranged an on-site meeting. On the long drive north to see the property, I kept wondering what the son meant by "some of the walls needed to be replaced."

Upon arrival, I could see that the cabin's exterior had seen better days. Built in the early 1980s by the father, its white pine log walls were severely deteriorated from a combination of years of hard Northeast weather, the exposed location (the cabin sat in the middle of hundreds of acres of open hayfield), and a lack of regular maintenance with wood sealer. After a long conversation with the father and son, I agreed to take on the gnarly building-envelope retrofit, which encompassed removing the existing log walls, windows, and doors all while working around the homeowner and his indoor cat.

Starting out, it took some time to have an energy audit done and organize funding (the homeowner qualified for the maximum level of a state-sponsored Heat-Saver Loan program, which made the energy upgrade possible). We planned to start demolition in spring, so, before winter set in, I temporarily sheathed the home's exterior walls to help keep wind and snow from entering the home through holes in the deteriorated walls. In late winter, the

The 40-year-old cabin was built on an exposed site in a region notorious for strong prevailing "Quebec" winds out of the Northwest **(1)**. Rot had penetrated 2 to 3 inches into the 8-inch-wide log walls, with the worst damage at sill locations **(2)**. The log wall was cut into manageable pieces and removed **(3)**.

Photos by Matt Burstein and Tim Healey; illustration by Tim Healey



For safe removal of the home's deteriorated log shell, temporary support walls were installed to pick up roof and floor loads. The remaining floor and roof systems were in decent shape (the home was re-roofed with metal AG panels a few years ago). The new replacement wall was installed as plumb and level as possible, given that the home's roof had flexed somewhat over time.

Working piecemeal, alone, the author removed only as much of the log wall as he could replace and seal up in a day **(4)**. The new wall was built from the inside out, starting with a continuous bead of sealant applied to the top of the existing foundation **(5)**. The vapor-control membrane was taped from the foundation up to an existing rough-sawn square top plate **(6)**.

The replacement wall was pieced together from the inside out **(7)**. The author worked his way down the rear wall **(8)**, then the front bearing wall, and finished up with the gable end **(9, 10)**. Although the home was clad with vinyl siding **(11)** and the exterior "essence" of the log cabin was removed, the main goals were to improve the comfort and longevity of the home.

homeowner hired an insulation contractor, who dense-packed the rafter bays with cellulose just before COVID-19 hit and a statewide lockdown was imposed.

Working piecemeal, alone. After the lockdown ended, I installed temporary support walls running the length of the home to support the roof and floor loads. I laid out the framework as well as was possible around homeowner's living space, then began to remove the rotted log walls in small sections beginning at one end of the rear bearing wall. I worked piecemeal, removing only as much wall as I could replace and seal up in a day.

With one section of the wall open, I began building the new wall from the inside out. I applied a continuous bead of Pro Clima Contega HF sealant to the top of the existing foundation in the opened-up work area and installed an interior Siga Majrex vapor-control membrane. I turned the bottom edge of the membrane onto the foundation and set it in the sealant, then ran the membrane up the wall and taped the top to the remaining rough-sawn square top plate. I had to cut and seal the membrane around existing log "joist" tenons, which were supported by a new 2x6 double top plate.

Next, I pieced together the studwall and infilled the bays with Roxul batts. Then I applied 2-inch foil-faced rigid polyiso, 1/2-inch CDX plywood sheathing, and a WRB membrane. With that wall section sealed up, I moved on to another section of the wall and repeated the process, working my way around the house.

The result was a 72% reduction in airflow, which was a vast improvement considering the home still had a leaky basement bulkhead in need of replacement.

Matt Burstein owns Practical Construction, based in Fairfax, Vt. He is a general contractor who specializes in building efficiency and durability.